

The apparent scarcity of the Black-bellied Storm Petrel in Australia could be due to its keeping well offshore during migration, or perhaps it is nowhere a common bird compared to say Wilson's Storm Petrel.

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#### EFFECTS OF FROSTING ON SOME COASTAL PLANT SPECIES

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During the nights of 9, 13, 14 and 22 June, 1981 in the Perth area the ambient temperature reached as low as 4 or 5°C (Perth Meteorological Bureau) and morning hoar-frost indicated the temperature in depressions along the coast dropped to below zero. In limestone heathlands in hollows at Ocean Reef (100 m from the sea) most of the plants were partially or completely defoliated. There were, however, a few unaffected species such as *Acacia cochlearis* (on the deeper soils) and *Leucopogon pauciflorus*, and two ground cover plants, *Loxocarya flexuosa* and *Lepidosperma gracile*.

Species with only a few plants slightly defoliated included *Allocasuarina humilis*, *Rhagodia baccata*, *Scaevola crassifolia* and *Spyridium globulosum*. Moderately to extensively defoliation species were *Calothamnus sanguineus*, *Carpobrotus edulis*, *Hardenbergia comptoniana* and *Solanum symonii*.

Many of the less severely damaged species had recovered within four or five weeks. Some of the more susceptible species which were fully defoliated were even affected (though less frequently) on slightly higher ground (only metres above the hollows) on areas where other plants were unaffected. These included the codominants *Acacia truncata* and *Dryandra sessilis* (Parrot Bush), which contained no underground parts other than normal roots and which were completely defoliated and died. The former species had failed to regenerate even from seed by April 1985, by which time, many small (0.5 m) plants of the Parrot Bush had germinated and begun to recolonize the area.

The method of recovery of the shrubs varied. The heavily affected *Hibbertia hypericoides* along with other less affected species such as *Grevillea*

*thelemanniana*, *Melaleuca acerosa*, *M. huegelii* and *Phyllanthus calycinus* grew from underground lignotubers and runners etc. A few of the species, however, grew from damaged branches above ground. These included *Hakea prostrata*, *Petrophile serruriae* and one, two metre high *Dryandra sessilis* bush (the only one in the hollow to survive).

Many of the *Acacia rostellifera* plants in a nearby thicket in the same depression as the heath but in deeper soil also died but some, though defoliated, has recovered by growing from above ground stems.

It was observed (1980) on the higher ground on the limestone heath that the population of the co-dominant, shallow rooted *Acacia truncata* contained many dead bushes which had been affected by drought and/or insect attack. It would appear therefore that the possession of substantial underground parts is advantageous for more reasons than drought or fire.

## UTILIZATION OF A PERTH METROPOLITAN WETLAND BY WATER BIRDS

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### INTRODUCTION

Wetlands on the Swan Coastal Plain provide an important habitat for many species of water birds in Western Australia. They are particularly important as summer refuges for birds that have left inland areas where lakes, filled by winter rains, dry out (Anon. 1978). Yet, 49% of the original wetlands between Yanchep and Harvey have been destroyed since European settlement of the region (Riggert 1966), thus drastically reducing the area available. It is therefore important to conserve as many of the remaining wetlands as possible and to understand what features of these wetlands are used by water birds.

This paper reports observations of the activities of the water birds on a small swamp in the Perth metropolitan area, and the parts of the swamp and its surrounds that were used by each species.

### DESCRIPTION OF STUDY AREA

The study area consisted of the waters and surrounding vegetation of a permanent swamp lying close to the Nicholson Road Bridge over the Canning River in Ferndale, 11 km south-east of the city centre. The unnamed swamp lies in a paddock bounded by the Canning River, Nicholson Road, and the eastern boundary of the built-up area of Ferndale. It has an area of about 0.83 ha and lies in a paddock of low dense swards of grasses, sedges, and herbs, that are grazed by sheep, cattle, and horses. The vegetation of the swamp perimeter is typical of the local riverine environment, as described by Pen (1983). It is dominated by *Eucalyptus rudis* and *Melaleuca* spp., and extensive areas of *Typha orientalis* are found at the upper and lower ends of the swamp.

### METHODS

From January 1978 to May 1981, observations were carried out between 0800 and 1100 hours, usually at weekly intervals. The activities and habitats of the birds were noted as I walked along the western margin of the swamp from the southern to the northern end. About half way along the open water of the swamp, the trunk of a fallen paperbark protruded horizontally into the water and provided a vantage point, from which further observations were made.

### RESULTS

A total of 24 species were observed on the swamp or in its immediate vicinity. The utilization of the swamp and its surrounds by 21 of these species is summarized in Figure 1. (The three species excluded from the figure are Pied Cormorant, Rufous Night Heron, and Straw-necked Ibis, which were rarely seen). They range from the Little and Hoary-headed Grebe and the Australasian Shoveler, which were only ever seen on the water, to the Purple Swamphen and the Little Pied and Little Black Cormorant, which were almost always seen out of the water. Those species, for whom no heights are indicated, perched exclusively on very low branches or half-submerged logs around the swamp perimeter or on the bank. With the exception of Dusky Moorhen, which were frequently on land, only Grey Teal, Pacific Black Duck,